Travis Austin

Curriculum Vitae

MS B284 (T-7)
Los Alamos National Laboratory
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Research Interests

Finite elements, least-squares methods, radiation transport, multilevel methods.

Education

University of Colorado, 8/1996 – 12/2001
Boulder, Colorado (USA)

⋆ **Ph.D., Applied Mathematics,** 12/2001

"Advances on a Scaled Least-Squares Method for the 3D Linear Boltzmann Equation, " co-advised by Profs. Thomas Manteuffel and Steve McCormick.

⋆ **M.S., Applied Mathematics,** 12/1998

Truman State University, 8/1992 – 5/1996
Kirksville, Missouri (USA)

⋆ **B.S., Mathematics,** 5/1996

Research Experience

Los Alamos National Laboratory
Mathematical Modelling and Analysis (T-7)
Los Alamos, New Mexico
⋆ **Postdoctoral Research Associate**, 10/2002 – present

- Helping in parallelizing robust multigrid code (BoxMG) used in solving diffusive problems on structured grids. Code was written in F77 and MPI.
- Developing theory and code for multilevel solvers used in solving mixed-type discretizations of diffusion equation in 2D and 3D.
- Continuing to improve on scaled least-squares model for the linear Boltzmann equation by allowing for 2D calculations, incorporating anisotropic scattering, allowing for reflective boundary conditions, and adding new solver capabilities.

University of Hanover
Institute for Applied Mathematics
Hanover, Germany
⋆ **Postdoctoral Research Associate**, 9/2001 – 9/2002

- Assisted in project focused on a least-squares method for solving 2D equations of linear and non-linear elasticity.
- Developed serial programs in Matlab and C to design a robust adaptive mesh refinement algorithm for solving elasticity equations.

- Co-taught a course that is titled 'FEMs for Elasticity and Plasticity'.

University of Colorado
Department of Applied Mathematics
Boulder, Colorado
⋆ **Graduate Research Assistant**, 9/1997 – 8/2001

- Developed and implemented a serial 2D FE code and multilevel solution method in C for solving variational equations derived from system of second-order equations, which is dominated by the operator $\mathbf{I} - \nabla\nabla\cdot$.
- Extended 2D idea to 3D and implemented it within a serial 3D FE code for solving the neutron transport equation which is formulated using least-squares and a spherical harmonic angular discretization of the flux unknown.

Lawrence Livermore National Laboratory
Center for Applied and Scientific Computing
Livermore, California
⋆ **Summer Graduate Research Assistant**, 5/1998 – 3/2001

- Assisted in the implementation of a numerical method for solving the 3D neutron transport equation using a least-squares finite element method.
- This work required becoming familiar and comfortable with using the set of orthogonal functions referred to as spherical harmonics.
- Participated in discussions on designing the algorithm for massively parallel architectures.

Teaching Experience

University of Colorado
Department of Applied Mathematics
Boulder, Colorado
⋆ **Instructor for Java II**, 6/2000

- Developed lecture notes, created programming assignments and designed and administered tests for a course taught during a 5-week period in June of 2000.

⋆ **Graduate Teaching Assistant**, 8/1996 – 5/1997

- Led recitations, led review sessions, held office hours, and graded weekly homework for more than 70 students for Calculus II (fall; 1996) and III (spring; 1997).

Publications

'A robust approach to minimizing H(div)-dominated functionals in an H1-conforming finite element space.' accepted for publication in *Numerical Linear Algebra and applications.*

'A least-squares finite element method for the linear Boltzmann equation with anisotropic scattering', in progress.

Awards and Fellowships

National Science Foundation VIGRE Award, 1999 – 2001 (CU-Boulder).

National Science Foundation Traineeship, 1997 – 1999 (CU-Boulder).

Outstanding Teaching Assistant in Applied Mathematics, 1997 (CU-Boulder).

Outstanding Senior in Mathematics, 1996 (Truman State University).

Presentations

Austin, T.M., *Controlling Div-Free Error in an* $\mathbf{H}^1$ *Conforming Finite Element Space.* Presented at GAMM 2002, Augsburg, Germany, March 2002.

Austin, T.M., and T.A. Manteuffel, *A Divergence-Free Relaxation Scheme in an* $\mathbf{H}^1$ *Finite Element Space.* Presented at the 6^{th} Copper Mountain Conference on Multigrid Methods, Copper Mountain, CO, April 2001.

Austin, T.M., P.N. Brown, and T.A. Manteuffel, *Developing a Scalable Transport Algorithm.* Presented at the 2^{nd} Annual Student Research Symposium, US Department of Energy/Defense Programs, Livermore, CA, July 1999.

Computer Skills

Programming Languages: C/C++, F77/F90, Java, MPI, Mathematica, Matlab.

Operating Systems: Unix/Linux, WindowsXP.

References

Dr. Thomas A. Manteuffel
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Dr. Steve McCormick
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Dr. J. David Moulton
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